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Fig. 39. BUCKEYE (*Aesculus sp.*)
A good foliaged form at Morris Arboretum.

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THE MORRIS ARBORETUM

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THE ASSOCIATES, through whose interest and generosity The *Bulletin* and certain other undertakings of the Arboretum are made possible, is an informal group of individuals interested in encouraging and furthering the educational and research endeavors of the Morris Arboretum. Further information concerning this organization will be sent on request.

An Unusual Aesculus

The tree of the cover illustration is a specimen of Horsechestnut or Buckeye which has been observed for many years growing upon a property adjacent to the Morris Arboretum. With the purchase of the new administration building the Arboretum has fallen heir to this tree.

As lawn specimens or shade trees the horsechestnuts and buckeyes too frequently have not very much to recommend them. European Horsechestnut is elegant in flower but has a tendency to shed its leaves throughout the summer while those it does not shed are browned by scorch or by the familiar leaf-blotch disease caused by the fungus *Guignardia aesculi*. The best of the native buckeyes are often thin in growth and affected by the same leaf-blotch disease. The odor of flowers and leaves of Ohio Buckeye, *Aesculus glabra*, is not particularly pleasant, and all horsechestnuts present the dubious gift of abundant fruit which litter the surroundings from September on.

The tree pictured is not without this fault; it bears abundant fruit which however ornamental it may be during the summer months is not especially sightly once it has reached the ground. The form of the tree, however, is admirable. Branching is dense for a horsechestnut. Foliage is thick, non-shedding, and of an excellent bright green turning a brilliant orange red in fall; but particularly outstanding is the resistance of this foliage to leaf blotch disease. When all other horsechestnuts in the region are browned beyond hope of recovery, this tree remains conspicuously rich and green. The quality of disease-resistance alone recommends it for propagation and testing on a much wider scale.

The botanical name of this individual has so far defied all efforts at precise determination. Its flowers are greenish white and not so conspicuous as those of the European Horsechestnut, *Aesculus hippocastanum*. The leaflets of its 5 to 7 palmately divided leaves are broader and decidedly thicker than those of Ohio Buckeye, *Aesculus glabra*, which it most closely resembles. Like both of these species its fruits are abundantly, though bluntly, spined. Neither flowers nor leaves have noticeable odor. The tree is a probable hybrid of *Aesculus glabra* while representing a marked improvement over that species.[1] It was thought that seedlings might show variation and afford some clue to parentage. At this date, however, they seem remarkably uniform, though whether they may be equally resistant to

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[1] In a recent communication from the Arnold Arboretum Miss L. M. Perry refers to a specimen of this tree as "more like collections of *Aesculus glabra* from Kentucky than any of the hybrids represented in our herbarium."

The New Administration Building

Frequent visitors to the Morris Arboretum are already acquainted with the new administration building which has been occupied during the past year. For the benefit of friends planning future visits, the new Arboretum Headquarters is situated on Meadowbrook Avenue on the left approach to the main entrance gateway. It stands on a four-acre property immediately adjacent to former boundaries of the Arboretum and will become a more apparently integral part as soon as adjustment of the fence lines can be undertaken.

Since the foundation of the Morris Arboretum in 1933, administration, library, herbarium, lecture rooms, etc., have been housed in the old mansion of the Morris family with which so many of our friends are familiar. Miss Morris, however, expressed the wish that her house should not be permanently used for this purpose. She desired rather that it be either razed or converted, with such structural alteration as would be necessary, to something more resembling a public shelter or meeting place. The means of complying with this request has posed a problem which became increasingly acute with each rise in building costs during the war and post-war periods, for it was impossible to comply with Miss Morris' wish concerning the mansion without first finding adequate quarters for offices and administration.

The residence of "Overlea" was built by Mr. David Pepper in 1893. Just prior to the first world war it passed into the hands of Mr. Russell Thayer and has remained in the family since that time. It became vacant in recent years and was purchased by the Arboretum in 1948. It was evident from our investigation that this property met the needs of an administration headquarters in an almost ideal way. The building is well constructed and the light and airy interior is well arranged for present needs, with space to spare for future expansion; its location is most convenient and the surrounding grounds form a natural continuation of the planting areas of

Fig. 40. The new Administration Building with the drive from Meadowbrook Avenue.

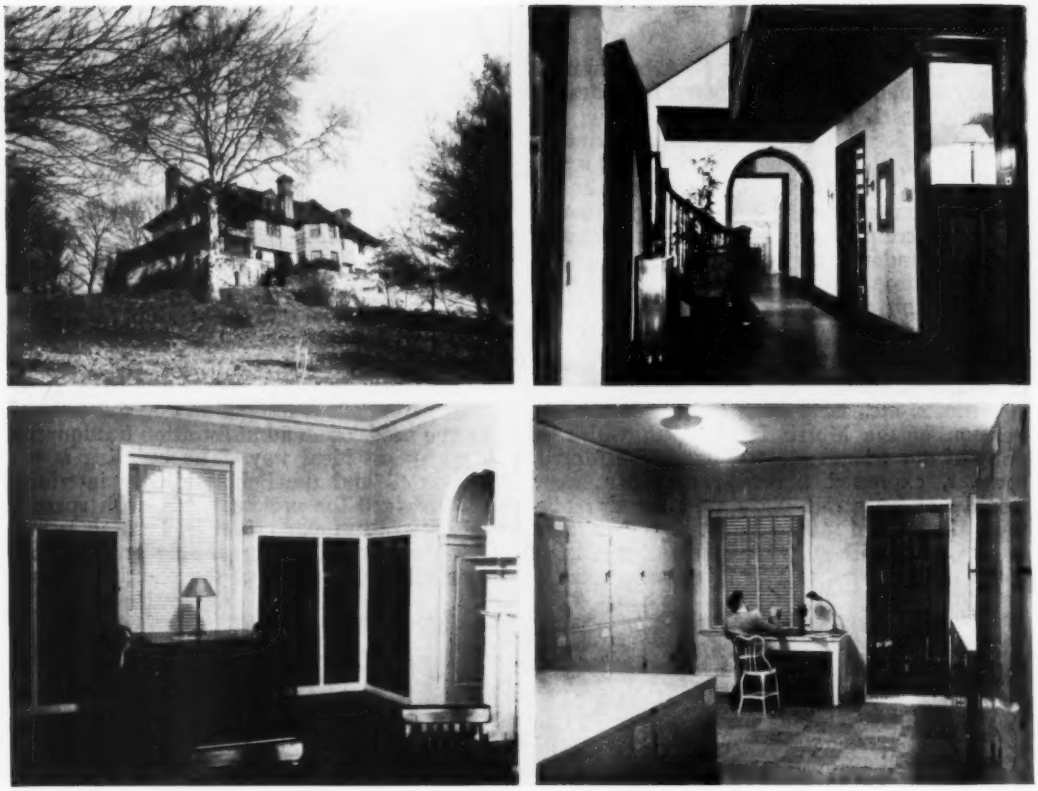

Fig. 41. Upper Left: Thomas Sovereign Gates Hall from the southwest. Upper right: the entrance hall, looking toward the library. Lower left: a view in the library reading-room. Lower right: a corner of the herbarium with its curator, Mr. J. W. Adams.

the Arboretum. Occupation of this building during the past year has served only to increase appreciation of the good fortune which, at minimum expense, has initiated such a satisfactory solution of a problem with which the Arboretum has been faced for so long.

The main entrance of this building opens into a central hall with dark wood panelling and beamed ceiling which serves well for accomodation of the general office. To the right of the hall is a lecture room seating about thirty, while to the far end, past the main stairway, is a pleasant library-reading room, with green walls and white woodwork; a small stack room is beyond. Also on the ground floor is one of the larger offices devoted to the work in Forest Genetics with a small laboratory adjoining. The second floor accommodates four offices, washrooms, etc., and, in a large room at the west end, the herbarium. Like the hallways and stairs, this room has been surfaced with asphalt tile and is well illuminated with modern fluorescent lighting. A third floor comprises four large rooms and an additional bathroom. These at present are used for storage purposes but will be available in the future for expansion of office and study space. A spacious basement containing five rooms underlies the entire building. One of these rooms is now used as a shop for making such things as labels and signs. It is expected that eventually the rest of the space will be used for a laboratory, dark-room, and such other facilities as are at present still housed in the Morris mansion. Hot water heat is provided by an oil-burning furnace.

The new administration building is situated at the top of a steep rise terminated at the lower end by the Scarlet Oak Avenue of the Arboretum proper, and pleasant views are to be had from the terraces over the lower ground and south across the Arboretum to the hill known as Sugar

Loaf beyond Germantown Avenue. Two smaller structures, a four-car garage and a "studio," are part of the property. The latter is of good size, with separate heating system, and may serve a useful purpose as classroom or headquarters for some of the school instruction groups.

In the acquisition of this property, as in other issues too numerous to mention, the Morris Arboretum has been indebted to the constant interest and support of the late Dr. Gates, Chairman of the University of Pennsylvania. It was doubly unfortunate in this case that his death should have occurred before the fruits of his interest were realized. In his honor, and with the gracious permission of Mrs. Gates, the new administration building will be known henceforth as Thomas Sovereign Gates Hall.

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Plant Acquisitions and Planting

During the years 1948 and 1949 approximately 1578 different kinds of plants have come to the Arboretum greenhouses and nurseries: 93 were of sufficient size to go directly into Arboretum plantings. The majority of the 776 seed packets received were requested on an exchange basis from arboreta and botanic gardens. Several Forest and Range Experiment Stations on the West Coast (Arizona, Montana, Wyoming, Utah, Washington and California) were most cooperative in sending seeds gathered from high altitude plants for tests of hardiness and adaptability in the East.

Many of the small plants received were azaleas and rhododendrons from the U. S. Bureau of Plant Introduction, from Mr. Joseph Gable of Stewartstown, Pa., Bobbink and Atkins Nurseries of Rutherford, New Jersey, and the Tingle Nursery Company of Pittsville, Md. Mr. Henry Hohman of the Kingsville Nursery sent an interesting group of named Japanese maples. With the encouragement and assistance of the American Holly Society, Mr. H. Gleason Mattoon and others, the American, English and Chinese hollies now growing at the Arboretum have been increased to more than 100 species and varieties.

From our own nurseries 1840 plants have been moved to their permanent locations in the Arboretum.

New developments during these years were the Baxter Memorial Overlook, the extensive azalea plantings along the edge of the lower Hillcrest Meadow, clearing and seeding of the slope below the new administration building, the Fraxinus collection near the Wissahickon bridge, the poplar collection near the old mill, partial dredging of the future Cypress Swamp, a new collection of cotoneasters, and the planting of over 60 named varieties of narcissus. Thousands of bulbs, given by the Arthur Hoyt Scott Foundation, were planted in sweeping masses around the rose garden, the log cabin and the spring house by high school boys who have come regularly to gain practical experience as part of their agricultural courses.

An appreciable number of plants were added to the evergreen collections around the Hillcrest and Meadowbrook gates and to the plantings at Bloomfield Farm. Slowly the pictures planned for these areas are taking shape.

Bloomfield Farm Area: A few of the additions to the young oak plantings include: a unique 10-foot specimen with a dense globular head called *Quercus palustris* Meehan's Globe, from Mr. Thomas Meehan of Plymouth Meeting; an 8-foot seedling from the giant White Oak, *Quercus alba,* in Wye Mills, Maryland; a Basket Oak, *Q. prinus,* from the Morton Arboretum; a native Scrub Oak, *Q. ilicifolia,* from Andorra Nurseries; *Q. texana,* a native of Texas, sent by Charles C. Deam, of Bluffton, Indiana; and a native of Asia Minor, *Q. haas.*

In the northwest corner of the Farm were planted six *Pinus densiflora,* early-fruiting seedlings selected by Dr. J. W. Wright, Forest Geneticist, and given by Andorra Nurseries.

In the future seashore planting area were grouped ten Table Mountain Pines, *Pinus pungens,* and two Scrub Pines, *P. virginiana,* from the Standing Stone Experimental Forest.

In the meadow south of the barn and along the creek, particularly around the Northwestern Avenue bridge, 28 ash trees were set out. Eight of these are tetraploid and hexaploid plants of *Fraxinus americana* given by Dr. Wright; one is a *F. holotricha,* native to the Balkan Peninsula, sent to the Arboretum from the U. S. Department of Agriculture. The remainder were raised from seed from Cologne, Leyden, Ottawa, Warsaw, the Arnold Arboretum and the New York

Botanical Garden. The two *F. excelsior monophyllum* from Warsaw, Poland, are probably the most unusual ash trees in the Arboretum with their undivided entire leaves. Two *F. velutina toumeyi,* known to serve well for street trees in the dry southwest where they are native, were placed near the road to the miller's house. A group of the Blue Ash, *F. quadrangulata,* valuable as timber trees, native in the mid-west, were planted above the future cypress swamp.

Planting near Meadowbrook Gate: Two of the more unusual evergreens added near the Meadowbrook Gate are a small Limber Pine, *Pinus flexilis,* given by the Soil Conservation Service of Colorado, and a blue Lawson Cypress, *Chamaecyparis lawsoniana glauca "Kooy"* among the low junipers bordering the path to the Morris Overlook. For lightness and color eight flowering trees were set out among the evergreens on this hilltop: three magnolias including *M. denudata* of Central China, a gift from the Ambler Nurseries; and two *M. soulangeanas;* a Japanese Witchhazel, *Hamamelis japonica,* gift of the Moore Nurseries in Narberth, Pa., a Weeping Cherry; a Chinese Red-bud from the Soil Conservation Service of North Carolina; a large-flowered, selected form of the Southern Fringe Tree, *Chionanthus virginicus;* and a Sourwood, *Oxydendrum arboreum,* a small native tree that is decorative the year round.

Rose Garden: Four varieties of the Saucer Magnolia, *M. soulangeana,* were planted around the upper side of the rose garden to give early color before the blaze of the rock wall reaches its height.

Hillcrest Avenue: An attempt has been made at the Hillcrest entrance to accent the slope of the land with sweeps of procumbent junipers and groups of tall, spirey arborvitae, with here and there, to give body to the planting, a full fat pine or winter-flowering shrub. With the 1948-49 additions, this planting really begins to hang together, and a formerly dull area offers much of interest. There is a fairly good collection of procumbent junipers here: *Juniperus chinensis alba, J.c. japonica, J.c. communis depressa, J. conferta, J. horizontalis alpina, J.h. plumosa,* and *J. sabina tamariscifolia.* The majority of these were gifts from Swarthmore College.

Three dwarf spruce and a few Warty Barberries, *Berberis verruculosa,* give interesting contrast among the low junipers as well as repeating somewhat the form of the Japanese maples and the big knob of a boulder at the edge of the road.

Among the other evergreens set out last season are: three hemlocks given by Mr. Charles F. Jenkins: the fine-needled variety of the American Hemlock, *Tsuga canadensis Jenkinsi;* the Western Hemlock, *T. heterophylla;* and the bright green, large-needled Chinese Hemlock, *T. chinensis;* there are pendulous and pyramidal forms of the Chinese Juniper, two plants of *J. mexicana,* a Formosan juniper, and many varieties of arborvitae from Col. Montgomery, Cos Cob, Conn.: *Thuja occidentalis alba, aurea spicata, Boothi, Buchanani, densiforma,* Dorset Yellow, "DT#2," *pendula* and *recurva.*

For winter or very early spring flowering there are two of the small-flowered yellow dogwoods, *Cornus mas* and *C. officinalis;* the fragrant Wintersweet, *Chimonanthus praecox;* and near a group of early, pale magenta azaleas is a hybrid Winterhazel, *Corylopsis,* given by Mr. Henry duPont; the new large-flowered *Forsythia* Spring Glory, gift of the Wayside Gardens, a Japanese Witchhazel and its variety *Hamamelis japonica flavo-purpurascens* from Moore Nurseries; one of the early fragrant honeysuckles, *Lonicera standishi lancifolia* from the Rochester Parks; and a number of willows: the big Catkin Willow, *Salix gracilistyla,* the Goat Willow, *S. Caprea,* and a rare fastigiate willow which forms a slender small tree.

Azaleas: Along the upper end of Oak Avenue and circling around through the chestnuts and old lilacs, long beds were dug deep and enriched with leafmold, peat and sludge in the winter. In spring 1948, when the five-to-six foot Japanese Azaleas, *Rhododendron japonicum,* were in full bloom, 260 of them were moved from the nursery into these beds. Their colors ranging from pale pinks through yellow pinks to orange pinks, were blended and mixed so that as one walks through them their beauty arouses anew an appreciation of nature's endless variations and possibilities. Almost ten years ago Mr. Henry Skinner selected the parents, made crosses, gathered the resulting seed, and from them raised these plants. He has selected the best of them as parents for oncoming generations.

For scattered shade on future azaleas, a number of trees were planted in the area northwest of these beds; two magnolias, the early fragrant *M. kobus borealis,* and the Cucumber Tree of the uplands, *M. acuminata; Betula pubescens;* a White Oak; several hemlocks; and the Chinese Wing-nut, *Pterocarya stenoptera.* For occasional shade in the long beds there are: a birch, *Betula papyrifera cordifolia;* the feathery fine-foliaged Honey Locust, *Gleditsia triacanthos;* two of the graceful Sourwoods, *Oxydendrum arboreum;* a Pitch Pine, *P. rigida;* the decorative Flowering Ash, *Fraxinus ornus;* and a Cedar of Lebanon. To flank the beds a score of native rhododendrons, *R. maximum* and *R. catawbiense* have been planted along Oak Avenue.

The Baxter Memorial: In 1947 the Germantown Horticultural Society proposed the gift of a brick overlook to be built at the Arboretum in honor of the late Samuel Newman Baxter, horticulturist of Fairmount Park and the Society's President for seventeen years. With the help of the Arboretum the circular brick overlook and its planting were completed for dedication ceremonies on June 5th, 1948. In a recess of the low balustrade is a durable cypress bench with a fitting inscription. The overlook is placed at the intersection of two paths, one to the rose garden through the orchard and the other leading up to the big hill through the viburnum collection. From the overlook there are several pleasing views: along the valley to a graceful large wild cherry, across the same valley through the spires of the tall swamp cypresses to the upper end of the Hillcrest evergreen collection, or across the varied greens of the Japanese garden to the gray beauty of the Himalayan Pine. The tall Silverbell trees, *Halesia monticola* and *H. diptera,* and the old crabapples give a feeling of enclosure. Several varieties of named American hollies are still to be planted for additional background to the overlook. Close by the south side a small ginkgo tree will form a future canopy for shade. Most of the low-growing cotoneasters from the large collection given by Princeton University border the path leading down from the overlook. As many as possible of Mr. Baxter's favorite plants have been used. Colonel George Woodward gave the beautiful specimens of English Boxwood, *Buxus sempervirens suffruticosa,* flanking the entrances. The border of Boxwood accenting the large silverbell trees that frame the entrance are the dwarf form of the Korean Box, *B. microphylla koreana.* Plants of the tiny-leaved form of Boston Ivy, *Parthenocissus tricuspidata Lowii,* given by the Moore Nurseries, are climbing up one balustrade post. On another post is the rarely seen *Decumaria barbara,* a climbing shrub native in our southern states. In a warm protected spot is a small plant of the evergreen Bull Bay Magnolia, *M. grandiflora.* If it thrives, it will be trained along the balustrade in the hope that its flower will scent this whole area. The strong pattern of its leaves and of the *Vitis coignetiae* should give a needed contrast to the predominantly fine textures of the rest of the planting. It is gratifying to see people enjoying this overlook—for its planting and significance, for visiting with one another, or just for resting in the quiet of the arboretum.

MARGARET A. LANCASTER

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Notes from the Laboratory

SOME ANOMALOUS FIR FLOWERS[1]

In fir as well as in other conifers, the male and female flowers are separate. Bisexual flowers, containing both male and female tissue, are sufficiently rare to excite interest.

During the 1947 breeding season, a Nikko fir (*Abies homolepis* Sib. and Zucc.) on the Morris Arboretum produced one bisexual flower in the lower portion of the crown. It was about the same size as the purely female flowers. The lower two-thirds consisted of female tissue, whereas the upper third was male.

The same season, a Greek fir (*A. cephalonica* Loud. var. *Apollinis* [Link.] Beiss) produced two bisexual flowers. Both were borne in the upper portion of the crown, as were the purely female flowers. As in the Nikko fir, these were the same size as the purely female flowers. The female tissue was in a collar about three-fourths of the way up the cone, and in a little patch at the very tip; the remainder of the flower was entirely male.

In both species the transition from male to female tissue was abrupt, there being no intergrades between the two types. Thus, the flowers were similar to that reported by Ferre[2] in *Picea montigena,* which was male at the bottom and had a small amount of female tissue at its very tip.

The flowers were picked just prior to anthesis. Hence it is unknown whether the male and female tissues would have performed their normal functions. However, the anthers appeared normal and apparently would have produced good pollen. Since only 1 of 7 and 5 of 80 normal female flowers matured on the Nikko and

[1] The observations recorded here were made in conjunction with the tree-breeding program of the Northeastern Forest Experiment Station, U. S. Forest Service, in cooperation with the Morris Arboretum of the University of Pennsylvania.

[2] Ferre, Y. de Quelques anomales de structure chez les Abietinees. Bull. de la Soc. d'hist. Nat. de Toulouse t. l, v. r, artl. 9, 12 pp. 1946.

Greek firs respectively during 1947, it is doubtful whether these partially female flowers would have set seed.

A careful check in 1948 failed to reveal any bisexual flowers on these or other firs used for breeding, although flowering was heavier than in 1947.

Another peculiarity of the Nikko fir tree should be mentioned. It bore normal female flowers within 7 feet of the ground (some of these matured seed in 1948) in both seasons. Indeed, only half its cone crop is in the very tip of the crown, the other half being scattered over the entire periphery of its 25-foot-tall and 25-foot-wide crown. All other species of firs bear cones only at the very top of the tree. Since this was the only flowering Nikko fir available, it is unknown whether this type of flower distribution is a peculiarity of this tree or of the whole species.

JONATHAN W. WRIGHT,

Geneticist, Northeastern Forest Experiment Station

A USEFUL POSSESSION

The attention of our readers is drawn to a very useful reference book, *The Directory of Arboretums and Botanical Gardens* published by the American Association of Botanical Gardens and Arboretums, of which association the Morris Arboretum is a member.

Besides detailed descriptive information concerning every arboretum and botanical garden in the United States and Canada, the directory contains an authoritative article on how to establish an arboretum or botanical garden, as well as maps showing arboretum locations, hardiness zones, etc., and a portfolio of photographic illustrations and line drawings of gardens past and present. An alphabetical grouping of these gardens by states and towns makes this an invaluable handbook for travelers of the highway who like to pause here and there for horticultural refreshment. This latest edition of the Directory was published in 1947, but a limited number of copies are still available at a price of $1.50 from The Morton Arboretum of Lisle, Illinois.

AN UNUSUAL AESCULUS

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leaf-blotch is yet to be determined. Such uniformity does not necessarily dispel the theory of hybrid parentage in view of the fact that the Red Horsechestnut, *Aesculus carnea*, although of proven hybrid origin, is a tetraploid which breeds perfectly true from seed. A horticultural name will doubtless be called for if progeny of this particular buckeye or horsechestnut make as good a showing under future testing as has the original during its probable 40 or 50 years of existence.

HENRY T. SKINNER

Fig. 42. Fruit and foliage of the hybrid (?) *Aesculus*. Fruit spines are well developed for *Aesculus glabra* but are not as long or pointed as those of *A. hippocastanum*.